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THE INFLUENCE OF THE MATERIAL OF WIND-INSTRUMENTS ON THE TONE QUALITY[1]

SOUND is the sensation resulting from the action of an external stimulus on the sensitive nerve apparatus of the ear; it is a species of reaction against this external stimulus, peculiar to the ear, excitable in no other organ of the body, and completely distinct from the sensations of any other sense.

Atmospheric vibration is the normal and usual means of excitement for the ear, this vibration being produced directly in some instruments, called wind-instruments, and indirectly through the vibration of elastic bodies in others, such as string and percussion instruments; and often the vibration originates in bodies not especially designed for producing sounds.

Physics is mainly concerned with the nature of the external stimulus, and the word sound is often restricted to refer only to these external stimuli. But the purely mechanical properties of these stimuli often differ among themselves differently than do the auditory effects. Our interest is largely in relation to musical sounds and hence for the present investigation we are concerned with the properties of the sounds of mechanical physics only in so far as they affect the ear, or produce sensation. We may, therefore, define sound substantially in the words of Helmholtz, as already given, and proceed

[1] Address of the vice-president and chairman of Section B, American Association for the Advancement of Science, delivered December 29, 1908.